IN THE SPECIFICATION:

Please amend the paragraph starting at page 1, line 5 and ending at line 7, as follows:

--The present invention relates to a vibration wave driving apparatus which obtains driving force from vibration waves, ~~waves~~ such as ultrasonic waves.--

Please amend the paragraph starting at page 1, line 9 and ending at line 22, as follows:

--A vibration wave driving apparatus which obtains driving force in three degrees of freedom (3D direction) ~~by~~ using vibration waves, ~~waves~~ such as ultrasonic waves, ~~waves~~ has been proposed. Japanese Patent Application Laid-Open No. 11-220891 discloses a vibration wave driving apparatus which can excite, in a Langevin type vibration element, in-plane expansion and contraction vibrations that displace in a longitudinal direction and two different types of ~~output~~ out-of-plane bending vibrations that displace in a direction perpendicular to the longitudinal direction. When at least two of these three types of vibrations are excited and synthesized, the driven member can be translated or rotated in an arbitrary direction.--

Please amend the paragraph starting at page 1, line 23, and ending at page 2, line 9, as follows:

--Although vibration wave driving apparatuses are required to be reduced in size and improved in function, the vibration wave driving apparatus disclosed in Japanese Patent Application Laid-Open No. 11-220891 is subject ~~are subjected~~ to constraints in

terms of a reduction in size in the longitudinal direction because in-plane expansion and contraction vibrations that displace in the longitudinal direction of the vibration element must be generated. As the size in the longitudinal direction decreases, the frequency of in-plane expansion and contraction vibrations increases. For this reason, to decrease this frequency to a practical frequency, a certain size must be ensured in the longitudinal direction.--

Please amend the paragraph starting at page 2, line 25 and ending at page 3, line 11, as follows:

--This vibration wave driving apparatus is, however, designed to generate driving force in two degrees of freedom, but there is no suggestion about an arrangement for generating driving force in three degrees of freedom. In addition, since two types of in-plane expansion and contraction motions must be generated, this apparatus is subject ~~subjected~~ to constraints in terms of a reduction in size in the longitudinal direction of the plate in order to suppress the frequency of vibrations. Therefore, the technical idea of this apparatus differs from that of the present invention, i.e., obtaining driving force in three degrees of freedom and reducing the size in the longitudinal direction.--

Please amend the paragraph starting at page 3, line 14 and ending at line 24, as follows:

--According to one aspect of this invention, there is provided a vibration wave driving apparatus which drives a driven member by ~~the~~ vibrations excited in a vibration member having electro-mechanical energy conversion elements, wherein the vibration member has a shape line symmetrical with respect to two planes orthogonal to

each other, and the electro-mechanical energy conversion elements can excite in the vibration member three different types of bending vibrations~~, in the vibration member,~~ which displace in a direction of axis common to two planes.--

Please amend the paragraph starting at page 5, line 14 and ending at line 16, as follows:

--Figs. 4A, 4B and 4C are views showing the behaviors of ~~the~~ driving points of the vibration element in Fig. 1;--.

Please amend the paragraph starting at page 6, line 22 and ending at page 7, line 21, as follows:

--The vibration element 1 is comprised of a vibration member 2 shaped such that a plurality of projections are formed on a surface ~~surface~~ of a substantially square plate made of a metal, ~~metal~~ such as phosphor bronze, ~~bronze~~ and piezoelectric elements 3, ~~3~~ which are bonded and fixed to the vibration member 2 and serve as electro-mechanical energy conversion elements. Contact projections PC1 to PC4 (to be described later) are formed at four substantially middle positions on the outer sides of the vibration element 1. The contact projections PC1 to PC4 protrude in the Z-axis direction to come into contact with a driven member (not shown) so as to transfer driving force to the driven member. These contact projections PC1 to PC4 respectively have driving points C1 to C4, on their end faces, which serve to transfer driving force to the driven member. Wear-resistant members, ~~members~~ which are made of SUS or the like and have undergone a surface oxidation process, ~~process~~ are integrally attached to the driving points C1 to C4 with an adhesive or the like. Projections PE1 to PE4 are formed at four substantially corner

positions of the vibration element 1. A projection PG is formed on a substantially central portion of the vibration element 1. A pressurizing magnet 5 for attracting or pressurizing the driven member (not shown) is placed on the central portion of the vibration member 2.--

Please amend the paragraph starting at page 7, line 22 and ending at page 8, line 2, as follows:

--Assume that two axes which are substantially parallel to ~~substantially~~ the square-plate-like surface of the vibration element 1 and perpendicular to each other are the X- and Y-axes, and an axis which is perpendicular to both the X- and Y-axes is the Z-axis. The vibration element 1 is formed to have a line symmetrical shape with respect to the X-Z plane and Y-Z plane as central.--

Please amend the paragraph starting at page 9, line 11 and ending at line 21, as follows:

--In Mode_βx and Mode_βy in Fig. 2, the piezoelectric elements for exciting vibrations in the same vibration pattern are arranged with a phase shift of 90°. If the shape of the vibration element 1 is line symmetrical with respect to the X-Z plane and Y-Z plane as central and equal in size in the X-axis direction and Y-axis direction, the resultant natural vibration frequencies coincide with each other. Note that in this embodiment, Mode_βx and Mode_βy are excited by ~~the~~ common piezoelectric elements.--

Please amend the paragraph starting at page 9, line 22 and ending at page 10, line 15, as follows:

--Mode_α in Fig. 2 is common to Mode_βx and Mode_βy in terms of out-of-plane vibrations, ~~vibrations~~ but differs from them in their vibration patterns. In most cases, therefore, the natural vibration frequency of Mode_α differs from that of Mode_βx and Mode_βy. It is therefore necessary to match the natural vibration frequency of Mode_α with that of Mode_βx and Mode_βy. As is obvious from Fig. 2, in this embodiment, out-of-plane vibrations in Mode_βx and Mode_βy are shorter in wavelength than those in Mode_α, and hence the natural vibration frequency of Mode_βx and Mode_βy is higher than that of Mode_α. For this reason, the projections PE1 to PE4 are formed at the four substantially corner positions where the vibration amplitude of Mode_βx and Mode_βy is relatively large, so as to increase the mass, thereby suppressing the natural vibration frequency of Mode_βx and Mode_βy and matching it with the natural vibration frequency of Mode_α. By forming these projections PE1 to PE4, the vibration displacements of the driving points C1 to C4 can be increased.--

Please amend the paragraph starting at page 10, line 23 and ending at page 11, line 11, as follows:

--Referring to Fig. 3, (+) and (-) indicate the polarization directions of the respective piezoelectric elements 3. Terminals A, B, and C and the lines connecting them to the respective piezoelectric elements 3 schematically show application terminals for driving vibrations and a connected state. "G" connected to the vibration member 2 indicates a common potential. When an alternating signal is applied to the terminal A, Mode_α is excited. When alternating signals with opposite phases are applied to the terminals B and C, Mode_βx is excited. When alternating signals in phase are applied to the terminals B and C, Mode_βy is excited. Mode_βx and Mode_βy, ~~Mode_βy~~ which are equal-root-mode vibrations, ~~vibrations~~ are excited on the common piezoelectric elements.--

Please amend the paragraph starting at page 11, line 14 and ending at page 12, line 15, as follows:

--Fig. 4A shows a vibration displacement state in which a rotation motion about the Y-axis (Ry in Fig. 1) or a translational motion in the X-axis direction is produced as a relative motion of the vibration element 1 and driven member. Driving signals are applied such that a phase ~~phase~~ of Mode_βx is delayed from that of Mode_α, ~~Mode_α~~ as the base phase, ~~phase~~ by π/2. The vibration displacements at the respective driving points C1 to C4 repeat temporal changes as indicated by "t1 → t2 → t3 → t4 → t1" to produce a circular or elliptic motion in the X-Y plane. With this circular or elliptic motion, a relative motion of the driven member, which is brought into contact with the driving points C1 to C4 under ~~with~~ pressure, and the vibration element 1 can be produced. When the vibration element 1 is viewed in the Y-axis direction from the driving point C4 side in Fig. 1, all the driving points C1 to C4 are rotating counterclockwise, with the points C1 and C3 undergoing the same rotational motion and the points C2 and C4 undergoing the same rotational motion. The rotation of the points C1 and C3 is λ/2 out of phase from the rotation of the points C2 and C4. The points C1 and C3 and the points C2 and C4 alternately come into contact with the driven member. Obviously, when driving signals are applied such that a phase ~~phase~~ of Mode_βx temporarily goes ahead of that of Mode_βx, ~~Mode_α~~ as the base phase, ~~phase~~ by π/2, the driving points rotate clockwise.--

Please amend the paragraph starting at page 12, line 16 and ending at line 23, as follows:

--If, for example, a spherical driven member 4S is selected, ~~selected~~ as shown in Fig. 5, and the vibration element 1 is fixed and supported, the driven member 4S

rotates about the Y-axis (Ry). If a flat plate-like driven member 4P is selected, ~~selected~~ as shown in Fig. 6A, and the vibration element 1 is fixed and supported, the driven member 4P translates in the X-axis direction.--

Please amend the paragraph starting at page 12, line 24 and ending at page 13, line 15, as follows:

--Fig. 4B shows a vibration displacement state in which a rotational motion about the X-axis (Rx), ~~(Rx)~~ or a translational motion in the Y-axis direction, ~~direction~~ is produced as a relative motion of the vibration element 1 and driven member. Driving signals are applied such that a phase ~~phase~~ of Mode_βy is delayed from that of Mode_α, ~~Mode_α~~ as the base phase, ~~phase~~ by π/2. As in the case of Mode_α and Mode_βx, elliptic motions are produced at the driving points C1 to C4 in the Y-Z plane. When the vibration element 1 is viewed in the X-axis direction from the driving point C1 side in Fig. 1, all the driving points C1 to C4 are rotating counterclockwise, with the points C1 and C3 undergoing the same rotational motion and the points C2 and C4 undergoing the same rotational motion. The rotation of the points C1 and C3 is λ/2 out of phase from the rotation of the points C2 and C4. The points C1 and C3 and the points C2 and C4 alternately come into contact with the driven member.--

Please amend the paragraph starting at page 13, line 16 and ending at line 22, as follows:

--If the spherical driven member 4S is selected, ~~selected~~ as shown in Fig. 5, and the vibration element 1 is fixed and supported, the driven member 4S rotates about the X-axis (Rx). If the flat driven member 4P is selected, ~~selected~~ as shown in Fig. 6A, and the

vibration element 1 is fixed and supported, the driven member 4P translates in the Y-axis direction.--

Please amend the paragraph starting at page 13, line 23 and ending at page 14, line 23, as follows:

--Fig. 4C shows a vibration displacement state in which a rotational motion about the Z-axis (Rz) is produced as a relative motion of the vibration element 1 and driven member. Driving signals are applied such that <u>a phase</u> ~~phase~~ of Mode_βy is delayed from that of <u>Mode_βx, as the</u> ~~Mode_βx as~~ base <u>phase,</u> ~~phase~~ by π/2. Elliptic motions are produced at the driving points C1 to C4 in the X-Y plane. Figs. 4A and 4B show the vibration displacements at the respective driving points in the same plane. In contrast to this, Fig. 4C shows the vibration displacements at the driving points C1 and C3 in the Y-Z plane, and the vibration displacements at the driving points C2 and C4 in the X-Z plane. When the vibration element 1 is viewed in the X-axis direction from the driving point C1 side in Fig. 1, the driving point C1 is rotating clockwise. When the vibration element 1 is viewed in the Y-axis direction from the driving point C2 side, the driving point C2 is rotating clockwise. When the vibration element 1 is viewed in the X-axis direction from the driving point C3 side, the driving point C3 is rotating clockwise. When the vibration element 1 is viewed in the Y-axis direction from the driving point C4 side, the driving point C4 is rotating clockwise. Since the rotational motions of the driving points C1 to C4 are λ/4 out of phase from each other, the driven member sequentially comes into contact with the driving points C1 to C4.--

Please amend the paragraph starting at page 14, line 24 and ending at page 15, line 5, as follows:

--If, ~~If~~ therefore, a ~~the~~ spherical driven member 4S is selected, ~~selected~~ as shown in Fig. 5, and the vibration element 1 is fixed and supported, the driven member 4S rotates about the Z-axis (Rz). If a ~~the~~ flat driven member 4P is selected, ~~selected~~ as shown in Fig. 6A, and the vibration element 1 is fixed and supported, a relative rotational motion about the Z-axis (Rz) can be produced between the driven member 4P and the vibration element 1.--

Please amend the paragraph starting at page 15, line 6 and ending at line 18, as follows:

--Although the motions in the respective axial directions and about the respective axes have been separately described above, driving forces can be generated in arbitrary directions by combining the respective natural vibration modes. When an elliptic driven member 4E is selected, ~~selected~~ as shown in Fig. 6B, ~~6B~~ and the vibration element 1 is fixed and supported, driving forces can be generated in the driven member to rotate it about the X-axis (Rx) and Y-axis (Ry) or a combination of these forces can be produced to move it in an arbitrary direction. If a driven member having a curved surface is used, the member can be driven about an arbitrary axis.--

Please amend the paragraph starting at page 15, line 19 and ending at line 26, as follows:

--The spherical driven member 4S in Fig. 5 may be ~~is~~ a CCD camera. That is, Fig. 5 shows an example of how the vibration wave driving apparatus according to this embodiment may be ~~is~~ applied to a positioning mechanism for a CCD ~~the CCD~~ camera. A CCD camera E is incorporated in the spherical driven member 4S. The CCD camera E can

be positioned in an arbitrary direction by the driving force generated by the vibration element 1.--

Please amend the paragraph starting at page 16, line 5 and ending at line 26, as follows:

--A vibration member 12, ~~12~~ as a part of the vibration element 11, ~~11~~ is formed by pressing using an iron-based plate member. The vibration element 11 is comprised of the vibration member 12 and piezoelectric elements 13, ~~13~~ as in the case of the vibration element 1 in Fig. 1. The forms of natural vibration modes excited in the vibration element 11 are also the same as those in Fig. 2. Contact projections PC11 to PC14 have driving points C11 to C14 at their distal ends. The contact projections PC11 to PC14 protrude in the Z-axis direction and also protrude outward in the X-Y plane. This arrangement makes it possible to enhance the displacements of the driving points C11 to C14. Likewise, projections PE11 to PE14 protrude in the Z-axis direction and also protrude outward in the X-Y plane, ~~plane~~ and serve to increase the mass at four substantially corner positions where the vibration amplitudes of Mode_βx and Mode_βy are relatively large, thereby matching the natural vibration frequencies of Mode_α, Mode_βx, and Mode_βy with each other.--

Please amend the paragraph starting at page 16, line 27 and ending at page 17, line 8, as follows:

--The shape of the vibration element 1 is not limited to this. As other shapes that obtain the effects of the present invention, for example, the shapes of vibration elements 21 and 31 shown in Figs. 8A and 8B may be used. The natural vibration modes

excited by the vibration element 21 are not limited to the above modes. For example, the same driving operation as that described above can be performed ~~by~~ using the natural vibration modes shown in Fig. 9.--

Please amend the paragraph starting at page 17, line 16 and ending at page 18, line 8, as follows:

--This vibration element differs from the one shown in Fig. 1 in that contact projections PC41 to PC44 are formed at four substantially corner positions of the vibration element 41, and projections PE41 to PE44 are formed at substantially middle positions on the outer sides of the vibration element 41. In this embodiment, since natural vibration modes having vibrations with the patterns shown in Fig. 11 are generated, the vibration element is formed into a shape that can efficiently excite these natural vibration modes. More specifically, the vibration element 41 is formed to be line symmetrical with respect to the X-Z plane and Y-Z plane as central. In order to suppress the natural frequency of Mode_βx and Mode_βy so as to match it with the natural frequency of Mode_α, the projections PE41 to PE44 are formed at the four substantially middle positions on the outer sides where the vibration amplitude of Mode_βx and Mode_βy is relatively large, ~~large~~ so as to increase the mass.--

Please amend the paragraph starting at page 19, line 10 and ending at line 25, as follows:

--When driving signals are applied such that a phase ~~phase~~ of Mode_βx is delayed from that of Mode_α, as the ~~Mode_α as~~ base phase, ~~phase~~ by π/2, a rotational motion about Y-axis (Ry) or a translational motion in the X-axis direction is produced as a

relative motion of the vibration element 1 and driven member. When driving signals are applied such that a phase ~~phase~~ of Mode_βy is delayed from that of Mode_α, as the ~~Mode_α as~~ base phase, ~~phase~~ by $\pi/2$, a rotation about the X-axis (Rx) or a translational motion in the Y-axis direction is produced as a relative motion of the vibration element 1 and driven member. When driving signals are applied such that a phase ~~phase~~ of Mode_βy is delayed from that of Mode_βx, as the ~~Mode_βx as~~ base phase, ~~phase~~ by $\pi/2$, a rotational motion about the Z-axis (Rz) is produced as a relative motion of the vibration element 1 and driven member.--

IN THE ABSTRACT:

Please substitute the abstract at page 25, with the following replacement paragraph.

--A vibration wave driving apparatus for obtaining driving force in 3D directions comprises a vibration member having a shape that is line-symmetrical with respect to two orthogonal axes, electro-mechanical energy conversion elements which can selectively excite in the vibration member three different types of bending vibrations, which each displace in a direction perpendicular to the two axes, and a driven member which is brought into contact with driving portions of the vibration member and driven by vibration excited in the vibration member.--

IN THE CLAIMS:

Please amend Claims 1 and 9, and add new Claim 21, to read as follows.

1. (Currently Amended) A vibration wave driving apparatus comprising:

a vibration member having a shape that is line-symmetrical with respect to two orthogonal planes;

electro-mechanical energy conversion elements which selectively ~~can~~ excite in said vibration member three different types of bending vibrations~~, in said vibration member,~~ which displace in a direction in parallel with the two planes ~~of axis common to the two planes~~; and

a driven member which is brought into contact with driving portions of said vibration member and driven by vibrations excited in said vibration member.

2. (Original) An apparatus according to claim 1, wherein said electro-mechanical energy conversion elements which can excite the three types of bending vibrations are arranged in the same plane.

3. (Original) An apparatus according to claim 1, wherein said vibration wave driving apparatus drives said driven member in an arbitrary direction in three dimensions by selecting and exciting two of the three types of bending vibrations.

4. (Original) An apparatus according to claim 1, wherein the driving portions of said vibration member protrude from said vibration member in a direction in which the three types of bending vibrations displace.

5. (Original) An apparatus according to claim 1, wherein two of the three types of bending vibrations have the same vibration pattern and are 90° out of phase from each other in the same plane.

6. (Original) An apparatus according to claim 5, wherein one of the two types of bending vibrations has a node at which an antinode of the other bending vibration is located.

7. (Original) An apparatus according to claim 1, wherein the three types of bending vibrations have the same natural vibration frequency.

8. (Original) An apparatus according to claim 1, wherein said driven member has a curved surface that comes into contact with the driving portions of said vibration member.

9. (Currently Amended) A vibration wave driving apparatus comprising:

a vibration member formed by ~~which is made up of~~ a plate member and projections protruding from a surface of the plate member and having ~~has~~ a shape ~~line~~ that is line-symmetrical with respect to two orthogonal planes;

electro-mechanical energy conversion elements which are fixed to a surface of the plate member which is opposite the surface from which the projections protrude, and selectively excite three different types of bending vibrations that displace in a direction perpendicular to the plate member; and

a driven member which comes into contact with the projections of said vibration member,

wherein synthesis of two of the three different types of bending vibrations selectively drives said driven member ~~are selected and synthesized to drive said vibration member~~ in an arbitrary direction in three dimensions.

10. (Original) An apparatus according to claim 9, wherein said electro-mechanical energy conversion elements are arranged in the same plane.

11. (Original) An apparatus according to claim 9, wherein two of the three types of bending vibrations have the same vibration pattern and are 90° out of phase from each other in the same plane.

12. (Original) An apparatus according to claim 11, wherein one of the two types of bending vibrations has a node at which an antinode of the other bending vibration is located.

13. (Original) An apparatus according to claim 11, wherein the two types of bending vibrations differ in vibration pattern from the remaining type of bending vibrations.

14. (Original) An apparatus according to claim 11, wherein the two types of bending vibrations are excited by said same electro-mechanical energy conversion elements.

15. (Original) An apparatus according to claim 9, wherein the three types of bending vibrations have the same natural vibration frequency.

16. (Original) An apparatus according to claim 15, wherein a mass of said vibration member is increased at a position corresponding to an antinode of one of the three different types of bending vibrations which has a short wavelength.

17. (Original) An apparatus according to claim 9, wherein said driven member has a curved surface that comes into contact with the driving portions of said vibration member.

18. (Original) An apparatus according to claim 9, wherein said vibration member has a square outer shape.

19. (Original) An apparatus according to claim 18, wherein the projections are arranged at substantially middle portions on the respective sides of the square.

20. (Original) An apparatus according to claim 18, wherein the projections are arranged at corner portions of the square.

21. (New) A vibration wave driving apparatus comprising:

a vibration member which has an electro-mechanical energy conversion element; and

a driven member which is in contact with the vibration member and is driven by a vibration excited on the vibration member,

wherein application of alternating signals to the electro-mechanical energy conversion element generates on a surface of the vibration member three bending vibrations having the same displacement directions but mutually different node positions.